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3 METHOD AND SYSTEM FOR GENERATING A CONFIGURATION  
4 DATABASE FILE BASED ON DATA FILES OF ECAD TOOLS

5 The present invention generally relates to the configuration of  
6 computer aided design systems. More specifically, it relates to an improved  
7 method and system for generating a configuration database file based on at  
8 least one data file of at least one ECAD tool included in a predefined tool list.

9 Computer aided design ("CAD") systems that design electronic  
10 circuits, often referred to as Electronic CAD ("ECAD") tools, assist in the  
11 design of electronic circuits by providing a user with a set of software tools  
12 running on a digital computer with a graphical display device. The design  
13 process has now become so complex that the current generation of integrated  
14 circuit (IC) chips, particularly in the case of VLSI chips, often cannot be

1 designed without the help of ECAD tools. ECAD tools are ideally suited to  
2 performing tasks implemented in the circuit design process because they can  
3 break down large, complicated circuits into a plurality of circuits of relatively  
4 simpler functionality. The ECAD tools can then iteratively lay out these much  
5 simpler circuits and achieve the desired overall design of the desired large  
6 complicated circuit.

7 In performing a circuit design task, the ECAD tool generally  
8 allows for a user to schematically create and/or edit circuit designs by  
9 graphically placing and connecting circuit components, which can be  
10 represented as objects by the ECAD tool. The ECAD tool performs  
11 calculational circuit design and evaluation tasks for the schematic circuit, such  
12 as optimizing the circuit, testing the circuit through simulation modeling, and  
13 the like. As represented by the ECAD tool, the circuit may comprise a plurality  
14 of "nets," with each net representing a connection between the terminals of two  
15 or more transistors. A net may also be referred to as a signal. An ECAD tool  
16 also typically generates a "netlist," which is a list of a group of logically related  
17 nets, including connectivity data for each. The netlist may be in the form of a  
18 database. Also, the netlist may describe a multiplicity of nets that can number  
19 into the millions for VLSI chips. As a result, netlists can be of enormous size  
20 and complexity.

21 Different types of sub-tools of an ECAD tool may also be used in  
22 IC design/evaluation tasks. Whenever an ECAD tool is used to analyze a  
23 netlist, it generally creates one or more output files from its processed analysis.  
24 In addition, there is often one or more configuration files, created by other  
25 ECAD tools or the users, that is associated with the ECAD tool. Both the  
26 output files and the configuration files include valuable information about the

1 netlist and the ECAD tool, and the information helps other ECAD tools or  
2 engineers in further analysis.

3 With the current methods, ECAD tools sometimes attempt to read  
4 the configuration files and the output files of other ECAD tools. In this case,  
5 ECAD tools generally gather needed information directly from the output files  
6 of other ECAD tools or manually created configuration files from users. One  
7 problem is that when the ECAD tool automatically reads the output files or  
8 configuration files generated by other ECAD tools, it may be difficult for users  
9 to determine what information was used in the analysis by a particular ECAD  
10 tool. However, such information may be helpful to the engineers and may be  
11 needed at a later time. Furthermore, during an analysis by an ECAD tool, a  
12 previous configuration file may be changed by a user without other users'  
13 knowledge. As a result, unnecessary confusion is created, and users may be  
14 unable to change the configuration in an appropriate manner. Also, current  
15 practices often create unintended changes of the configuration files of the  
16 ECAD tools, because a change in the configuration file of one ECAD tool often  
17 affects the configuration of other ECAD tools. Thus, there is a need for an  
18 improved method for keeping track of the configuration files and the output  
19 files of the ECAD tools.

#### 20 BRIEF SUMMARY OF THE INVENTION

21 The present invention is directed to an improved method and  
22 system for generating a configuration database file based on data files of  
23 ECAD tools. More specifically, it relates to an improved method and system  
24 for generating a configuration database file based on one or more data files of  
25 one or more ECAD tools included in a predefined tool list.

1           The present invention provides a method that includes the steps  
2 of selecting an ECAD tool from a predefined tool list, reading a data file of the  
3 selected ECAD tool, and generating a configuration database file based on the  
4 read data file.

5           The present invention also provides a computer system that  
6 includes a storage medium and a processor for generating a configuration  
7 database file based on one or more data files of any ECAD tool included in a  
8 predefined tool list. The program further includes a set of instructions for  
9 selecting an ECAD tool from a predefined tool list, reading a data file of the  
10 selected ECAD tool, and generating a configuration database file based on the  
11 read data file.

## 12                           DESCRIPTION OF THE DRAWINGS

13           FIGURE 1 shows a block diagram of a computer system on  
14 which the method may be performed; and,

15           FIG. 2 is a flow chart illustrating the preferred functionality of a  
16 method of the present invention.

## 17                           DETAILED DESCRIPTION

18           Broadly stated, the present invention is directed to an improved  
19 method and system for generating a configuration database file based on one or  
20 more data files of any ECAD tool included in a predefined tool list. An ECAD  
21 tool is first selected from a predefined tool list, followed by a data file of the  
22 selected ECAD tool to be read. A configuration database file based on the read  
23 data file is then generated.

1 A block diagram of a computer system on which the present  
2 invention may be implemented is shown in FIG. 1, and indicated generally at  
3 10. As with most typical computer systems, there is a display device 12 for  
4 displaying data to users, a processor 14 for processing data, an input device 16  
5 for users to input data, and memory 18 for storing the data. The processor 14  
6 accesses the memory 18, which may store, among other things, CAD tools 20,  
7 CAD tool output files 22 (output files are generally generated by the CAD tools  
8 as a result of their analysis), CAD tool configuration files 24 (configuration  
9 files contains configuration information about a particular ECAD tool, and they  
10 can be generated manually by the engineers or automatically by the CAD tools  
11 during their processes), a circuit netlist 26 (herein "netlist") and a configuration  
12 database file generated by the present invention.

13 Since the present invention is preferably implemented as an CAD  
14 tool itself (herein "Invention CAD tool"), the Invention CAD tool, as well as  
15 various CAD tools 20 are stored in the memory 18 for analyzing the netlist 26,  
16 which is a data file for storing the topology of the chip design. The  
17 interconnection of the blocks is not shown as they are known to those skilled in  
18 the art. When in use, the input device 12 receives a command for instructing  
19 the processor 14 to call the Invention CAD tool software 20 that generates a  
20 configuration database file 28 according to a predefined tool list 29 defined  
21 with one or more of the other CAD tools. Prior to an analysis by one of the  
22 CAD tools in the predefined tool list, a configuration file 24 may be generated  
23 or changed by a user. After a result is obtained from the CAD tool's analysis,  
24 an output file 22 will typically be created by the CAD tool. From these output  
25 files 22 and input configuration files 24, the configuration database file 28 is  
26 generated for the CAD tools in the predefined tool list, and preferably there is a

1 separate field for each file in the configuration database file. The configuration  
2 database file may then be displayed on the display device 12 to the users or be  
3 used by other CAD tools.

4 As a result of the many possible implementations for the present  
5 invention, an explanation of the current preferred embodiment of the computer  
6 system is given as an example. The complexity of the various available  
7 implementations is furthered not only by the use of different file formats that  
8 can change, but also because of the software or firmware that is needed to work  
9 with the given desired file formats. In trying to present a clearer description of  
10 the present invention, an ECAD tool implementation will be used as an  
11 example. However, it should be understood that others skilled in the art can  
12 appreciate the implementations of the various systems and configurations, and  
13 these implementations are within the scope of the present invention.

14 Turning to an important aspect of the present invention, a flow  
15 chart of the preferred functionality of a method of the present invention is  
16 shown in FIG. 2, and indicated generally at 30. The method is preferably  
17 initiated automatically by ECAD tools upon a certain predefined command.  
18 However, manual initiation by users is also contemplated, depending on the  
19 design and needs of the implementation. Thus, it should be understood that  
20 other various methods of initiation are within the scope of the present  
21 invention.

22 A predefined tool list including one or more ECAD tools is first  
23 defined preferably by users (block 32). Because the users can customize the  
24 tool list of ECAD tools according to their needs and desires, a user can use  
25 multiple tool lists that generate multiple configuration database files. By  
26 generating multiple configuration database files according to predefined tool

1 lists, the present invention enable users to keep track of data files that are more  
2 customized. Consequently, while an ECAD tool may change a configuration  
3 file for one of its analyses, the present invention enables the user to either use  
4 the prior configuration of the ECAD tool, or automatically update the  
5 configuration database file without affecting the configuration files of any other  
6 ECAD tools.

7 Nevertheless, the tool list can be defined automatically by other  
8 ECAD tools or other programs. Furthermore, any number of ECAD tools can  
9 be included. Users can define all the ECAD tools stored in memory, or a  
10 predetermined number of predefined ECAD tools can also be included. Again,  
11 this depends on the desired implementation of the user. Accordingly, these  
12 other various ways of defining the tool list are contemplated and within the  
13 scope of the present invention.

14 After a tool list is defined (block 32), an ECAD tool is then  
15 selected from the predefined tool list for processing (block 34). A file list  
16 including the data files for the selected ECAD tool is also preferably defined  
17 (block 36). The data files preferably include all the output files and  
18 configuration files of the selected ECAD tool. However, any type or number  
19 of data files can be included and are contemplated. For example, the user may  
20 want to keep track of other types of data files relating to the ECAD tool or data  
21 files according to a predefined date. User customizations of both the tool list  
22 and the file list are contemplated by the present invention, and other various  
23 methods to implement these customizations are within the scope of the present  
24 invention. In addition, the file list is preferably defined automatically by the  
25 algorithm of the present invention. However, the file list can also be defined  
26 by users, other ECAD tools or other related programs. Accordingly, other

1 alternative methods according to the implementation chosen by the user are  
2 contemplated, and they are within the scope of the present invention.

3 After the file list has been defined (block 36), a data file is  
4 selected (block 38) and read (block 40) from the file list. Then, a step of  
5 determining whether a configuration database file exists in the memory is  
6 preformed (block 42). In other words, it is determined whether a previously  
7 saved configuration database file has already been saved on the system. If not,  
8 a new configuration database file based on the data read from the data file is  
9 created (block 44). It should be noted that, although the next step is preferably  
10 performed shortly after any steps where a determination is required (i.e., a  
11 decision box), the present invention, nevertheless, contemplates other steps  
12 being inserted between the determining step and any steps following  
13 immediately after. Because there are numerous ways to implement the method  
14 of the present invention, the present method contemplates alternating the orders  
15 of the steps and adding other additional steps. These alternative methods  
16 should be understood to be within the scope of the present invention.

17 If, on the other hand, there is a configuration database file that is  
18 already in the memory (block 42), it is then determined whether this  
19 configuration database file is older than the read data file (block 46). If the  
20 configuration database file is not older than the read data file (block 46), it  
21 indicates that the read data file has already been added to this configuration  
22 database file at some previous time. As a result, it is unnecessary to process  
23 the read data file, and the process can reloop back to select another data file  
24 from the file list (block 38). Conversely, if the configuration database file is  
25 not older than the read data file (block 46), which indicates that the read file



1 has not been processed, the data from the read data file is then replaced or  
2 inserted into the previously saved configuration database file (block 48).

3           Once the data from the read data file has been added to either a  
4 new configuration database file (block 44) or an existing configuration  
5 database file (block 48), it is determined whether all data files from the file list  
6 have been selected (block 50). In other words, it is checked to determine  
7 whether all the data files included in the file list have been processed. If not,  
8 the process reloops back to select another data file from the list (block 38).  
9 Otherwise, the process continues, but this time, it is determined whether all  
10 ECAD tools from the predefined tool list have been selected (block 52).  
11 Similarly, if all ECAD tools from the predefined tool list have not been  
12 selected for processing, the method reloops back to select another ECAD tool  
13 from the tool list (block 34). Once it is determined that all ECAD tools from  
14 the tool list have been selected (block 52), the configuration database file is  
15 then stored to the memory (block 54), which can later be used by other ECAD  
16 tools or users. The process is then completed (block 56).

17           From the foregoing description, it should be understood that an  
18 improved system and method for generating a configuration database file have  
19 been shown and described, which have many desirable attributes and  
20 advantages. The system and method provide a way for users to generate the  
21 configuration of an ECAD tool without affecting other configuration  
22 information. Furthermore, users are provided direct visibility into the actual  
23 configuration of the ECAD tools. With the generation of the configuration  
24 database file, the configuration files of two different ECAD tools remain  
25 independent of each other. As a result, it is also now possible to change the  
26 configuration of one ECAD tool without affecting the configuration of other

1 ECAD tools. Consequently, a more flexible and efficient method is provided  
2 while users are given more control and visibility of the ECAD tools'  
3 configurations.

4 As shown, users can now customize what is to be logged in the  
5 configuration database file by predefining the ECAD tools to be included in the  
6 tool list. As a result, a user can generate multiple configuration database files,  
7 according to the needs and desires of the user. By generating multiple  
8 configuration database files according to predefined tool lists, the present  
9 invention enables users to keep track of data files that are more customized.  
10 Consequently, while a user of a ECAD tool may change a configuration file  
11 prior to an analysis, the present invention can either use the configuration  
12 information stored prior to the change, or update the configuration database file  
13 without affecting the configuration files of other ECAD tools.

14 While various embodiments of the present invention have been  
15 shown and described, it should be understood that other modifications,  
16 substitutions and alternatives are apparent to one of ordinary skill in the art.  
17 Such modifications, substitutions and alternatives can be made without  
18 departing from the spirit and scope of the invention, which should be  
19 determined from the appended claims.

20 Various features of the invention are set forth in the appended  
21 claims.